

Leonardo Anatrini, Marco Ciardi, *La scienza Impossibile. Percorsi dell'alchimia in Francia tra Ottocento e Novecento*. Roma: Carocci, 2020. 212 pp. 22€. ISBN: 9788843096206.

Leonardo Anatrini and Marco Ciardi gave their work an interesting title (*La scienza impossibile*, The impossible science), and a somehow surprising subtitle: *Paths of alchemy in France between the nineteenth and twentieth centuries*. Anyone acquainted with Lavoisier's theories may be puzzled by this subtitle, and wonder how could alchemy flourish in nineteenth- and twentieth-century France, the cradle of modern chemistry. In actual fact, the intertwining of chemistry and alchemy has long been recognized by historiography. The first sixty pages of Anatrini's and Ciardi's well-structured book report an introductory essay devoted to the cultural components that have fuelled the persistence of alchemical thought far beyond the emergence of chemistry as canonical science of the atomic-molecular world. More precisely, the first section of this essay analyses the survival of alchemical thought more than a century after the publication of Lavoisier's *Traité élémentaire de chimie* (1789).

Joseph de Maistre (1753–1821), a French intellectual whose work became a cornerstone of reactionary thought, was against Lavoisier's revolution. *The impossible science* highlights at least two (mainly ideological) reasons for his opposition: Lavoisier's denial of the value of tradition and the fact that the number of elements could be unlimitedly multiplied, at least potentially. This latter issue was largely debated by chemists and physicists throughout the nineteenth century (and beyond). In general, the portrait that Anatrini and Ciardi give of de Maistre is rather interesting and punctuated by quotations that retain an ambiguous relevance nowadays. According to de Maistre, in his time – between the eighteenth and nineteenth centuries – scientists “usurped an unlimited influence in any field; if today we have a certainty, it is that it is not for science to guide men. Nothing necessary is entrusted to her” (p. 16).

The introductory essay of the *Impossible Science* is followed by an anthological part dedicated to the writings of six authors. Five of these documents are the expression of French culture in its most classical forms: a military essay by A.-L. Quenaidit and (partly) F. Jollivet-Castelot, a scientific one by L. Figuier and A. Poisson, and one in the form of state bureaucracy, personified by A. Faucheux. This variety of professions demonstrates the transversal character of an alchemical thought capable of involving chemists, doctors, infantry officers, high state bureaucrats. On the other hand, the writings in the anthological part show that the authors of those texts never refer to their own laboratory experiences, a fact that underlines the purely speculative character of their alchemical practice. The introductory essay effectively describes how the

French speculations on alchemy were fostered and encouraged by the esotericism/occultism of A.L. Constant (1810–1875, known under the pseudonym of Éliphas Lévi) and G. Encausse (1865–1916, known as Papus).

Anyway, Anatrini and Ciardi's exploration is not limited to French culture as they discuss the strong 'cultural injections' prompted by two internationally renowned figures that are radically different from each other: Eléna Petróvna von Hahn, best known with the anglicized name of Helena Blavatsky (1831–1891) and William Crookes (1832–1919). Blavatsky was a very prolific writer, co-founder of the Theosophical Society in 1875 with the American Henry Steel Olcott (1832–1907), a former Federal colonel and lawyer. Blavatsky's influence on French alchemists was exerted both through the Theosophical Society and her writings. An article by Blavatsky, published in 1889 in *Le Lotus bleu, la revue théosophique*, is part of the anthological section of the book. Crookes was among the best-known scientists of the last decades of the nineteenth century. His scientific achievements range from the discovery of Thallium through spectroscopic analysis (1861) to the invention of the radiometer in 1873 (a 'gadget' whose operation was the object of a lively debate among theoretical physicists), and the detection of a new radioactive substance called UrX (Thorium isotope 234) in 1900. In turn, Crookes' research on UrX influenced the experimental practices that led Ernst Rutherford (1871–1937) and Frederick Soddy (1877–1956) to discover the transmutation of the elements (1901). Crookes exerted a strong influence on French alchemists with his theory on the evolution of the elements from a single type of material particle called 'protyle' (see below). A relevant instance of such influence is found in Faucheux's article anthologized in *The impossible science*.

From an epistemological viewpoint, the work by Anatrini and Ciardi is stimulating, in that it relies on the uncertain and oscillating border between science (chemistry), non-science (theosophy, occultism, esotericism), and pseudo-science (alchemy). Although the book refers to (cultural and material) situations and characters that belong to the past, the narration offers keys for understanding the current phenomenon of pseudo-sciences.

The authors underline (pp. 33–34) that official science and occult sciences were both perceived as distinct and opposed *cognitive systems*, endowed with their own internal completeness and coherence (real or apparent), albeit based on radically different foundations: the experimental method and *a posteriori* confirmation, in the case of official science; tradition and *a priori* belief, in the case of occult sciences. The reference to tradition is the key to understanding phenomena, as French occultism maintained that "becoming part of tradition was equivalent to affirming part of the truth" (p. 56). The system of occult sciences intended itself as a "new epistemological paradigm," aimed at contrasting

and completing that of physical sciences (p. 19). The final goal was to seek and attain (not necessarily to share) the Truth.

Two key-terms recur in the text: analysis and synthesis. The authors report that, according to Papus, the understanding of the radical dualism that underlies the existent must be based on the analytical method of science and the synthetic method of tradition (p. 53). Therefore, occultists seek a synthesis that contrasts with the intrinsically analytical nature of science (see Jollivet-Castelot's *Hyperchimie*, which aspires to reconcile esotericism and chemistry).

The comparison with today's situation is singular and, to some extent, illuminating. Nowadays, it is precisely when official science experiences an unmatched cognitive power, that we record the formidable explosion of pseudo-sciences. The rationality wherein official science is rooted is perceived both as a source of sought-after certainties (the Coronavirus's story is exemplary) and the foundation of a system whose cognitive claims are perceived as hegemonic. Science therefore becomes the expression of a system of power which, in the eyes of many people, must be contrasted. The search for a synthesis can (perhaps) explain the success of pseudo-sciences as a response to a request that science does not seem capable of satisfying. In this way, the lack of synthesis becomes a *vulnus*. This is not the right place for deepening such complex matter: we will just notice that Anatrini's and Ciardi's book offers valid ideas for understanding the roots of pseudo-science and rethinking the relation of science and rationality with the various forms of knowledge of reality.

From the viewpoint of the historiographic 'technique', the impossible science is a truly impeccable work in many respects. The authors' attention to the semantic quality of translations is witnessed by this note: "All internal citations to the texts have been translated from the original reference version and not from any French translations used by the authors" (p. 60). It is clear that a work of history of science is intrinsically open, in that different exegeses are possible, both regarding the context of a text (the figure of the author, his cultural situation, the editorial opportunity) and its interpretation. In Anatrini and Ciardi's book, the French abbot Jacques-Paul Migne (1800–1875) is presented in these terms: "publisher, printer and journalist" (p. 35). Given the importance of Migne in the history of classical philology and patristics, a few more lines on him might have been spent in his presentation. Migne was the editor and the publisher of 227 volumes of Latin Patristics and 166 volumes of Greek Patristics. On the other hand, Migne was also a journalist; he was a regular correspondent for *Chemical News*, a scientific newspaper published by Crookes.

We already mentioned the great influence exerted by William Crookes on the French alchemy *fin de siècle*, which is well documented in this book. On p. 47, Crookes is presented as "one of the greatest chemists and physicists of

his time,” while the pages of Crookes’ essay on the genesis of the elements are qualified as “the work of a consummate occultist” (p. 117). Here, it is worth remembering another genesis, that of Crookes’ article. Crookes was a free-lance chemist who made good money from the weekly publication of *Chemical News*, a newspaper read all over the scientific world. An article by J. Emerson Reynolds (1844–1920), professor of chemistry at the University of Dublin, entitled “Note on a method of illustrating the periodic law” was published in the July 2, 1886 issue of this journal. Reynolds drew the series of elements as a broken line, zigzagging across a vertical line: thus, Reynolds’ physical model was a vibrating string. On September 2, 1886, in his speech as the President of the chemical section of the British Association for the Advancement of Science, Crookes turned the Reynolds’ diagram into an ‘evolutionary’ image that astounded French alchemists. Crookes’ *epistemic leap* turned the representation of current experimental evidences (the atomic weights of the elements known in 1886) into the representation of a conjectural historical process (the origin of the elements over time). In a note of the edition of the “Genesis of the elements” published in 1889, Crookes argues about the legitimacy of using the word *ύλη* (hyle) to coin the term *protyle*, by quoting Solomon, Bacon and Aristotle. We believe that these marginal quotations are not enough to justify the definition of Crookes’ article as “the work of a consummate occultist.” Not only French alchemists, but also scientists got interested in Crookes’ conjecture: this is the case for the Irish physicist J.G. Stoney (1826–1911), who proposed the term ‘electron’ before its discovery, and the German chemist Julius Thomsen (1826–1909), the founder of thermochemistry. We believe that this double reading of the “Genesis of the elements” by alchemists and scientists confirms the rightness of what Anatrini and Ciardi write at the very end of their book: “we hope that it can contribute to a better understanding of the history of the complex relationships that existed (and still exist) between science and belief” (p. 191).

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